SUBJECTIVE TELEPATHIC EXPERIENCES, GEOMAGNETIC ACTIVITY AND THE ELF HYPOTHESIS:

Part I. Data Analyses

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Previous analyses have indicated that subjective telepathic experiences concerning death and sickness are more likely to occur on days when geomagnetic activity is lower than the days immediately before or after the experiences. In the present study, 57 telepathic cases that contained the day, month and year of the experiences were compared with 56 precognitive cases that served as source controls. The experiences had occurred between the years 1920-1967. Repeated measure analyses indicated that the telepathic experiences occurred on days when the geomagnetic activity (aa indices) was significantly lower than on the days immediately before or after the experiences. This geomagnetic effect was not apparent for the precognitive experiences. These results suggest that quiet geomagnetic conditions and the various ELF (extremely low frequency) bands that are transiently generated during these phases may be involved with telepathic experiences. (Authors' abstract).

Introduction

Spontaneous subjective experiences of telepathy or clairvoyance (T-C) involving death, sickness or crises to friends and relatives are frequently so intense that the experients record them in diaries or tell friends or family members. When T-C experiences occur, they usually involve extreme alterations in autonomic tone, such as feelings of

impending doom or incapacitation. When these experiences occur at night or during sleep, they usually cluster around dream periods. If they occur just before dream periods, the most typical descriptor is that the experient "suddenly awoke" [1]. These patterns have not changed from the time of the first major publication by Gurney, Myers and Podmore [2].

Our approach to these intriguing experiences is that they are evoked by environmental stimuli. These stimuli are **correlated** with death, sickness or crises to other people. Although we still reserve the traditional labels of "agent" and percipient (or experient), we do not assume necessarily that the agent "sends" information. Rather we assume that some environmental stimulus is associated with the crisis or death condition of the agent. The stimulus influences the percipient or contributes to the occurrence of the psi experience. Several models concerning the relationship between the agent, the percipient and the third factor (the environmental event) have been described [3,4].

The nature of T-C phenomena demands an environmental stimulus that can penetrate buildings and propagate for thousands of meters [3]. The environmental stimulus must also have the capacity to directly influence the brain of the experient. Whether or not the stimulus carries all of the information contained in the experience or merely triggers stored sequences is not critical at this stage of development. Possible neural mechanisms for the detection of these stimuli are discussed elsewhere [5].

We have been developing the hypothesis that ELF (extremely low frequency) electromagnetic fields are associated with T-C experiences. The ELF hypothesis is actually a generic label. In fact there are many ELF hypotheses [6], each dealing with specific frequency bands, wave forms and periods of duration. Traditionally, two major ELF sources have been acknowledged: the Schumann resonances and geomagnetic pulsations. The Schumann bands, whose fundamental frequency is around 7-8 Hz, is generated within the earth-ionospheric wave guide. Geomagnetic pulsations involve a much wider frequency range that includes mHz variations.

Test of the Hypothesis

To date, the major limitation for a test of the ELF hypothesis has been the lack of correlative measurements. Consequently we began looking for a measurement that could be used as an **inferred reference** for the occurrence of the optimal ELF fields. We reasoned that if this inferred reference was significantly and systematically related to the occurrence of T-C, then future technology should demonstrate a clear relationship between the inferred reference and the optimal ELF fields.

Geomagnetic activity was selected as the inferred reference. We assumed, on the basis of the available literature, that the 10 Hz ELF band and the 1 mHz to 1 Hz band or both should be less disrupted in both frequency and intensity during days of relatively quiet geomagnetic activity. The rationale was simple: quiet geomagnetic days would allow the resting frequencies of a dynamic system, either the Schumann resonance cavity or the sources for geomagnetic pulsations, to dominate the environment.

On the other hand, geomagnetically active days should be characterized by greater heterogeneity of signals in the environment. This heterogeneity would be due to the fact that geomagnetic activity is associated with a variety of primary effects, such as impact of the solar wind, passage through the solar sector, and the myriad of secondary sources that can be generated from the collisions between the magnetosphere and the interplanetary medium.

The rationale is based upon proportion. During relatively quiet geomagnetic days, the resonances within frequencies (or wave forms) that are compatible with brain activity should be more prominent. These frequencies would also be present during more active days, but the probability of alteration of these signals or their masking by greater noise in the environment would increase. Again, at this point, we have no quantitative measure of the accuracy of this presumption.

Interference Index. We selected the aa (antipodal average) index as our measure of geomagnetic activity. The aa index was selected because of its long history. The data

base begins in the year 1868 and continues to the present. Since many of our T-C occurrences occurred as early as 1920 and we have plans to investigate claims from years even before that time, we wanted a more or less homogeneous data base.

The aa index is based upon the geomagnetic activity at two stations. One of them is in England, the other is in Australia. The aa index contains a daily measure for the northern hemisphere and a daily measure for the southern hemisphere. In addition, it contains an average of the northern and southern hemispheres for the first half of each day and an average of these two hemispheres for the second half of each day. Monthly and yearly averages for each of these three measures are also included.

Approach. Our approach was a modified version of retrospective epidemiology. In this instance, we reasoned that the critical features of the T-C cases were essentially the dates (day, month and year) of the experiences. The T-C experience was considered the clear endpoint to processes that may have involved minutes to hours before it occurred, depending upon which model was correct.

The approach also required no commitment to any theoretical assumption about the validity of the experiences. Essentially a researcher could argue that the validity of the experiences was zero. In this instance, what the person said he experienced may had little in common with the actual stimulus that was presented. Even in this extreme instance, however, the **date** of the experience remained. If these dates on which T-C experiences were reported to have occurred were systematically related to geomagnetic activity, then some relationship between the two would be strongly suggested.

Methodology. We selected a repeated measures design whereby each case is used as its own control. In this procedure, the value of the geomagnetic activity (the aa index) on the day of the experience is compared with the values of the geomagnetic activity on the days before or after the experience. It is assumed that if many cases occur on days which have similar values but are different

than the days immediately before or after them, then the effect is not likely to be due to chance.

A repeated measure analyses was considered most relevant since successive days of geomagnetic activity are not independent. Usually geomagnetic activity on one day is correlated significantly with the day before and afterward, but less so with the second day before and after and much less with the third day before or afterward. Consequently, we compared the geomagnetic activity of the key day (the day of the experience) and the geomagnetic activity for the three days before and the three days after the experience.

Two types of repeated measure analyses were used: nonparametric and parametric. The nonparametric analysis was used since some geomagnetic values were very large and tend to skew the data base. The nonparametric procedure works on the basis of ordinal ranking of values, from the least intense to the most intense. We still wanted to use the full extent of the ratio scale of the aa indices, which would require parametric analyses (analysis of variance). Consequently, data transformation was required. This analysis was only performed on the square root transformations of the aa values. This procedure minimized the contributions from the outlier values and reduces the skewness to acceptable levels (less than 1.0).

Previous Work. The use of this procedure was encouraged by positive results [7] from Stevenson's sample [8]. A repeated measure analysis was used on the 25 spontaneous subjective T-C cases from Stevenson's sample that contained the specific dates of occurrence. The geomagnetic activity (aa indices) for the days on which the experiences occurred was much lower than the days before or afterward. The effect was highly statistically significant ($p<.001$). Moreover the standard error of the mean of the aa values on the days on which the experiences occurred was much less than the standard error of the mean for the days before or after the experiences. This suggested that these experiences also occurred on days that had very similar absolute values of the aa index.

Method

Data Source

All data were obtained from Fate magazines that had been published between the years 1960 and 1970. All experiences that were published in the sections entitled "My Proof of Survival" and "True Mystical Experiences" were read, but only those cases that contained the day, month and year of the experience were used in this study. A total of 216 experiences from all categories were obtained.

Our rationale for selecting the Fate data base was based upon the strength of the anticipated effect. If the relationship between the occurrences of T-C experiences and quiet geomagnetic conditions was as conspicuous as noted in previous analysis [7], then such a robust effect should certainly emerge, although more weakly, within a general sample. Although parapsychologists seem to have preferred small samples of proofs that have been subjected to extensive corroboration, we expected that a robust effect should be evident in large, undifferentiated samples.

This approach assumes that errors from confabulation, memory disturbances or simple temporal discrepancies should be more likely to cancel out within large samples and become a type of background noise. Experiences that were actually correlated with geomagnetic activity would then be superimposed upon this "average baseline." We calculated that even if 50% of the cases were due to random errors, a sample of about 50 cases should demonstrate a more or less stable noise level across a seven-day period (the key day plus or minus three days). The twenty-five "true" cases should demonstrate the relationship.

There was also no empirical basis for assuming a priori that the Fate cases would be less representative of the phenomena than those reported in more "acceptable" data sources. To our knowledge, with the exception of Persinger [1], no researcher has seriously penetrated the Fate data base. In fact, analyses of approximately 600 reports from Fate indicate that they are remarkably similar to the characteristics of experiences that have been given greater credibility by some psi researchers.

With T-C experiences, for example, the Fate data [1] showed that 79% of the agents were dying, suddenly sick or in crisis at the time of the percipient's experience. In comparison, 82% of the agents in Stevenson's sample [8], 79% of the agents in the Sanwald sample [9] and 76% of the agents in the cross-cultural sample of Prasad and Stevenson [10] were dying or in crisis. Whereas in the Sanwald and Stevenson study, the agent was a member of the immediate family 50% and 63% of the time, respectively, 53% of the Fate cases showed this pattern. In fact, Persinger [1] did not find a single major discrepancy between the major characteristics of the Fate data base and those from more traditional sources.

Procedure

Two classes of psi experiences were compared. The first involved T-C cases, the second involved precognitive experiences. Of the 216 total experiences reported in the data source, 57 of the cases were classified as T-C and 56 were classified as precognitive. T-C cases were defined as experiences that occurred within a few minutes of the event. Precognitive cases were defined as temporal displacements of more than an hour (usually several hours to days) between the experience and the event.

The precognition cases served as **source controls** or references. We suspected that there was a possibility that any relationship between geomagnetic activity and T-C experiences may not be specific to those experiences but involve a general psi (or reporting) factor. In addition, the reference cases were described within a similar length (numbers of words) and contained syntactic structure that was similar to the T-C cases. Finally, the precognition cases should be similar in all other respects to the T-C cases except that there was a displacement in time between the experiences and the events.

There were no statistically significant differences between the condition of the agent or the sex of the percipient between the T-C and precognitive cases. When the cases were dichotomized into sudden sickness/crisis versus death of the agent at the time of the experience, 39 of the

T-C cases and 37 of the precognition cases involved death (chi-square 0.07, df=1,p>0.5). Although most of the percipients were female (81%) versus male (19%), there were no sex differences between T-C and precognitive cases (chi-square 0.45, df=1, p>.05). Similarly when the four modes of experience - intense feeling, impression (image), dream or apparition - were analyzed, there were no statistically significant mode differences (chi-square 4.57, df=3, p>.05) between the T-C and precognitive experiences.

Data Entry. Each T-C and precognitive case for which there was day, month and year information was coded. The aa values for the northern hemisphere for the key day (day of the experience) and for the three days before and the three days after the experience were obtained from Mayaud [11]. In addition, the values of the aa indices for the month and the year for those cases were also loaded.

Analyses. Following determination of the numerical moments (measures of central tendency, dispersion, skewness and kurtosis), the data were analyzed by SPSS and BMDP2V software on a DEC 2020 System computer. The nonparametric Friedman's test was used from the SPSS program while the repeated measure analyses of variance program was used from BMDP81. The T-C and precognitive cases were analyzed separately. To check internal consistency, the first half of the cases (for the years 1929 to 1954) were analyzed separately from the cases from the second half (1955 to 1967) of the analysis period.

Results

The means and standard errors of the means for the days on which the 57 T-C experiences occurred and for the three days before and after the experiences are shown in Fig. 1A. The Friedman's test indicated that there was a statistically significant (p<.001) difference between the mean ranks (chi-square 27.44, df=6). The mean rank on the days of the experiences was 2.68, compared to the other days whose mean ranks varied from 3.91 to 4.46. As can be seen in Fig. 1A, the major source of the significance was due to the lower aa values on the days of the experiences compared to the days before and afterward.

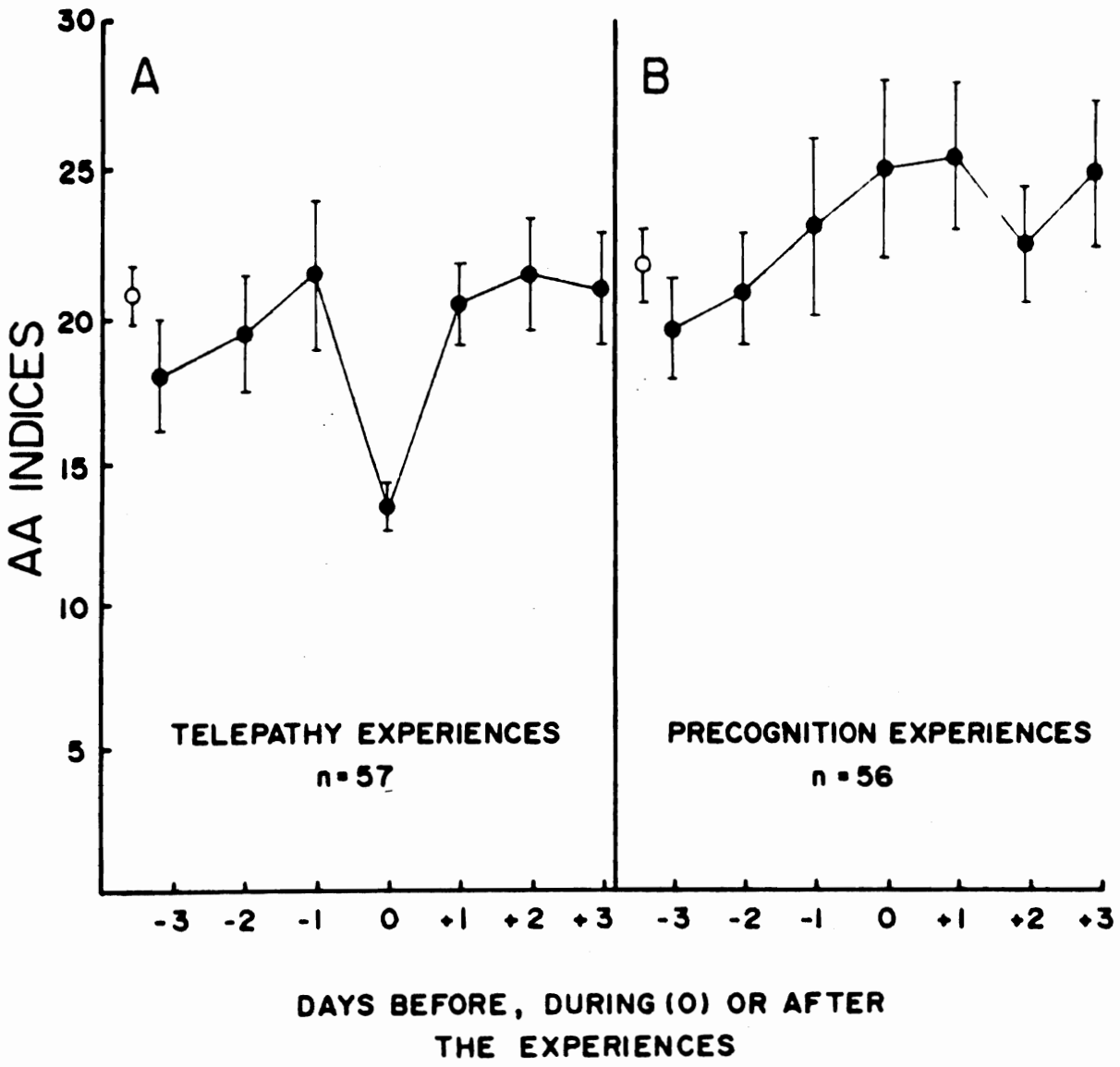

Fig. 1. Means and standard errors of the means (vertical bars) for the aa indices (a measure of geomagnetic activity) on the days of (day 0) and the days before and after psi experiences concerning death, sickness or crises.
(A) Relationship between geomagnetic activity on the days of, before and after 57 subjective telepathic experiences. Note the smaller dispersion values on the days when the experiences occurred. (B) Relationship between geomagnetic activity on the days of, before and after 56 subjective precognitive experiences. N refers to numbers of cases. Open circles refer to the means of the aa values for the months in which the experiences occurred.

On the other hand, the Friedman's test indicated that there were no statistically significant differences ($p>.05$) between the mean ranks for the 56 precognition experiences (chi-square 3.98, df=6, $p>.05$). As can be seen in Fig. 1B, the days on which the precognition experiences occurred displayed aa values that were similar to those of the days before and after the experiences. Interestingly, the aa values on the days of the T-C experiences were significantly lower (chi-square 13.52, df=1, $p<.001$) than the aa values on the days that the precognitive experiences occurred.

Comparisons of the aa values on the days of the T-C experiences with the aa values for the months in which the cases occurred were highly statistically significant ($p<.001$). AA values on the days of the experiences were lower ($t=5.23$, df=56) than the monthly averages. However, the aa averages for the months in which the experiences occurred were not different statistically ($t<1.00$; $p>.05$) from the aa averages for the years in which the T-C experiences occurred. On the other hand, there were no statistically significant differences ($p>.05$) between the aa values on the days of the precognitive experiences and the average aa values for the months in which the experiences occurred ($t=1.04$) or between the monthly averages and the averages for the years ($t<1.00$) in which the experiences occurred.

Repeated measure analyses of variance on the square root transformations of the aa values reaffirmed the relationship between geomagnetic activity and T-C experiences. The conservative Greenhouse-Geisser criterion indicated a statistically significant ($p=.005$) difference between the aa values ($F=6.14$, df=6, 336) for the days before, after and during the experience. A posteriori t-tests indicated that the major source was between the day of the experience and all of the days before or afterward (t-values between 2.04 and 4.82). However, no significant repeated measure effect was noted for the precognition cases ($F=0.92$, df=6, 330, $p>.05$).

Further analyses between the T-C cases from the first half of the experience period (1920 to 1954) and the second half of the period (1955 to 1967) separately demonstrated statistically significant differences between aa values on

the days of the experiences compared to the days before or afterward. The chi-square values were 13.65 ($p<.05$) and 17.61 ($p<.01$) respectively for the two periods. For the precognition cases, neither half demonstrated any statistically significant ($p>.05$) effect.

Separate analyses for the T-C cases as a function of the mode of the experience - feeling, impressions, dreams, and apparitions - indicated that the most significant geomagnetic effect occurred with the first three modes. The apparitional mode alone did not show a statistically significant geomagnetic effect (although the trend was still evident). In other words, the days on which these types of experiences occurred did not display significantly lower geomagnetic activity than the days before or afterward.

However, interestingly enough, a two-way analysis of variance that directly compared apparitional experiences with dreams (the two modes that showed the most similar hourly time of experience) indicated that the former occurred during a 7-day period when the geomagnetic activity was lower ($F=6.89$, $df=1,27$, $p<.01$) than the activity during the dream T-C experiences. Consequently, whereas the dream T-C experiences occurred during days that were quieter than the days before or afterward, the apparitional experiences occurred during a period when not only the days of the phenomena, but also the days before and afterward, tended to show little geomagnetic activity.

T-C experiences reported by both sexes demonstrated the geomagnetic activity effect. The 45 cases that involved female experients occurred on days when the geomagnetic activity was lower than the days before or afterward (chi-square 22.93, $p<.001$). The mean rank for the days on which the experiences occurred was 2.66 compared to the ranks of 3.91 to 4.63 for the days that followed or preceded the experiences. The major effect was due to the aa values on the days the experiences occurred. However, the 12 male experients demonstrated another type of day difference (chi-square 17.59, $p=.007$); not only the day of the experience but also the second day before the experience displayed lower aa values than the other days.

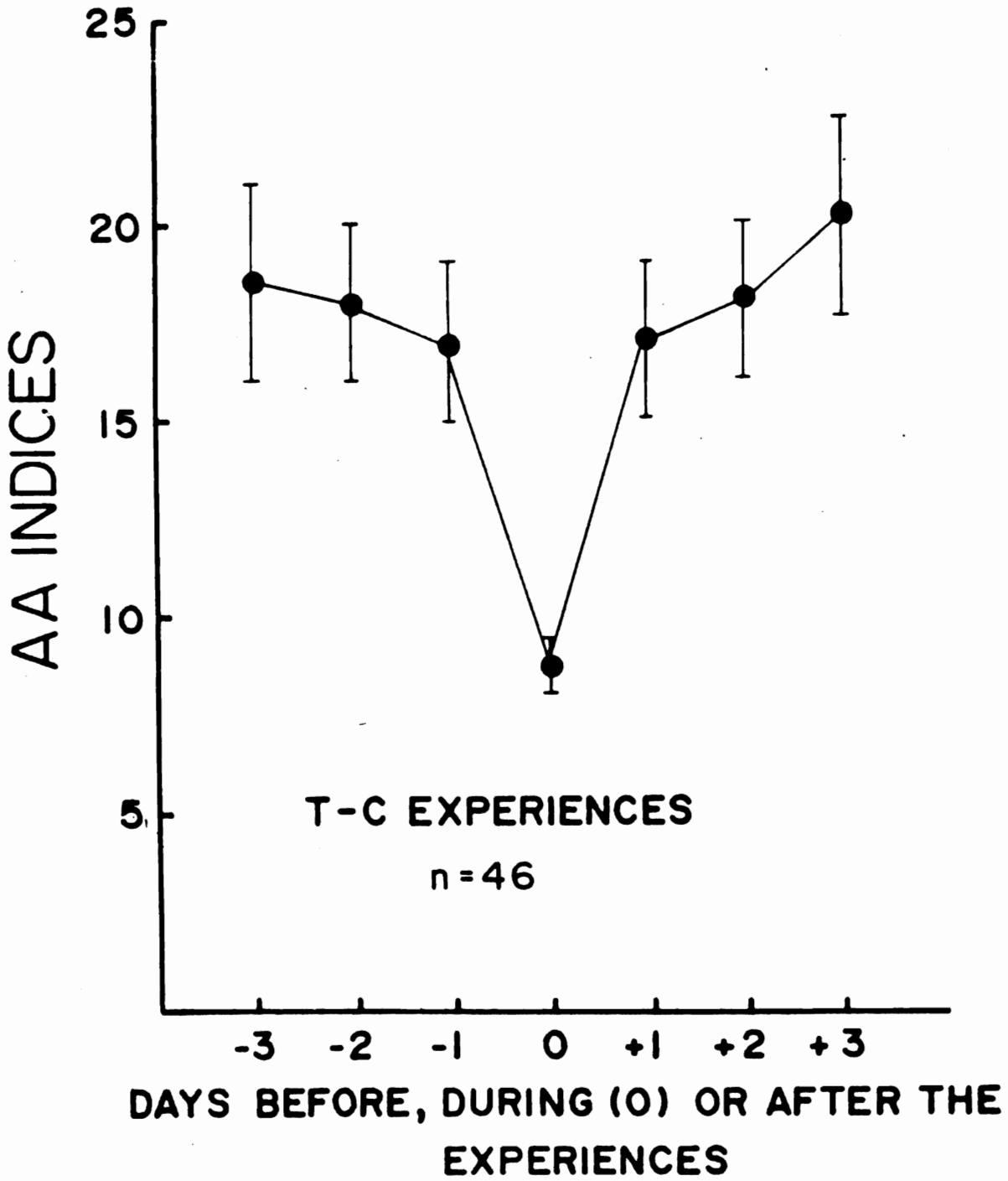

Fig. 2. Means and standard errors of the mean (vertical bars) for the aa indices (a measure of geomagnetic activity) on the days of (0), before and after subjective telepathic experiences concerning death and sickness or crisis. These 46 cases comprised those experiences that occurred on days when the aa values were within the normal distribution curve.

Fig. 2 shows the results for the 46 cases of T-C experiences that were within a normal distribution curve. The days on which the experiences occurred displayed significantly lower aa values than any of the other days (chi-square 33.94, df=6, $p<.001$). The mean rank for the days of the experience was 2.32 compared to the other days whose ranks ranged from 4.21 to 4.36. In comparison, only 25 (about 50%) of the cases from the precognition group occurred on days where the aa value was less than 18.1. However, the aa values for these days did not differ significantly from the days before or afterward (chi-square 6.51, df=6, $p>.05$).

Discussion

The results of this study clearly indicate that spontaneous subjective T-C experiences are more likely to occur on days when the geomagnetic activity is lower (quieter) than on days before or after the experiences. This pattern was statistically significant and was evident in the experiences that occurred between 1920 and 1954 (the first half of the data) and between 1955 and 1967 (the second half of the data).

However, there were no statistically significant differences between the geomagnetic activity on the days in which precognitive experiences occurred and the days before or after those experiences. The precognitive cases were used as control or reference cases. They were derived from the same data base and primarily involved discrepancies between the time of the experiences and the time of the events. In short, the lack of effect in the precognition cases indicates that the geomagnetic effect was specific to the T-C cases and was not due to some general factor.

Of course, there may be some geomagnetic or geophysical factor involved with precognition cases. However, in order to ascertain any relationship, a different procedure would be required. For this test, the geomagnetic values on the day of the experiences and the geomagnetic values on the day of the events would be compared. Our pilot work indicated that precognition cases, especially those involving death, tend to occur on quiet geomagnetic days. However, the

actual events (death), which can occur a day to four or five days later, occur on days when there is very active geomagnetic activity. In addition, the experiences tend to occur on the upward slope of the daily activity measures, particularly just after the trough when the geomagnetic activity begins to increase.

The tendency for T-C experiences to occur on days that displayed less geomagnetic activity than the days immediately before or after the experiences was similar to previous results [7] involving a smaller sample. It involved 25 cases reported by Stevenson [8] (that contained the day, month and year of the occurrence); they were corroborated by the author and were dominated by "impressions." The cases that were included in that analysis also involved only death or sickness of the putative agent. For that analysis, adjustments were made for time zones and the time of day in which the experience occurred.

To allow more direct comparison with the results of the present study, the Stevenson cases were reanalyzed using only the aa values from the northern hemisphere. In addition, there was no shift or adjustment for time of day (when these data were available). As can be seen in Fig. 3, the general results are similar to those found in the Fate data. The days on which the occurrences took place were geomagnetically quieter than the days before or after. The major discrepancy occurred with the exaggerated increase in geomagnetic activity during the second day following the experiences. Although further analyses must be completed, we have noted a similar trend in T-C cases that may have involved a precognitive component (e.g., the T-C experience is sickness of the agent who then dies two or three days later). About 25% of Stevenson's cases involved experiences that would meet this criterion.

Certainly the results of this study are only compatible with the ELF hypothesis; they do not prove the hypothesis. We have assumed that there is some optimal ELF band, mode or waveform that is inversely correlated with geomagnetic activity. This optimal ELF stimulus should have a greater effect on the portions of the brain involved with T-C experiences than other components of the ELF spectrum.

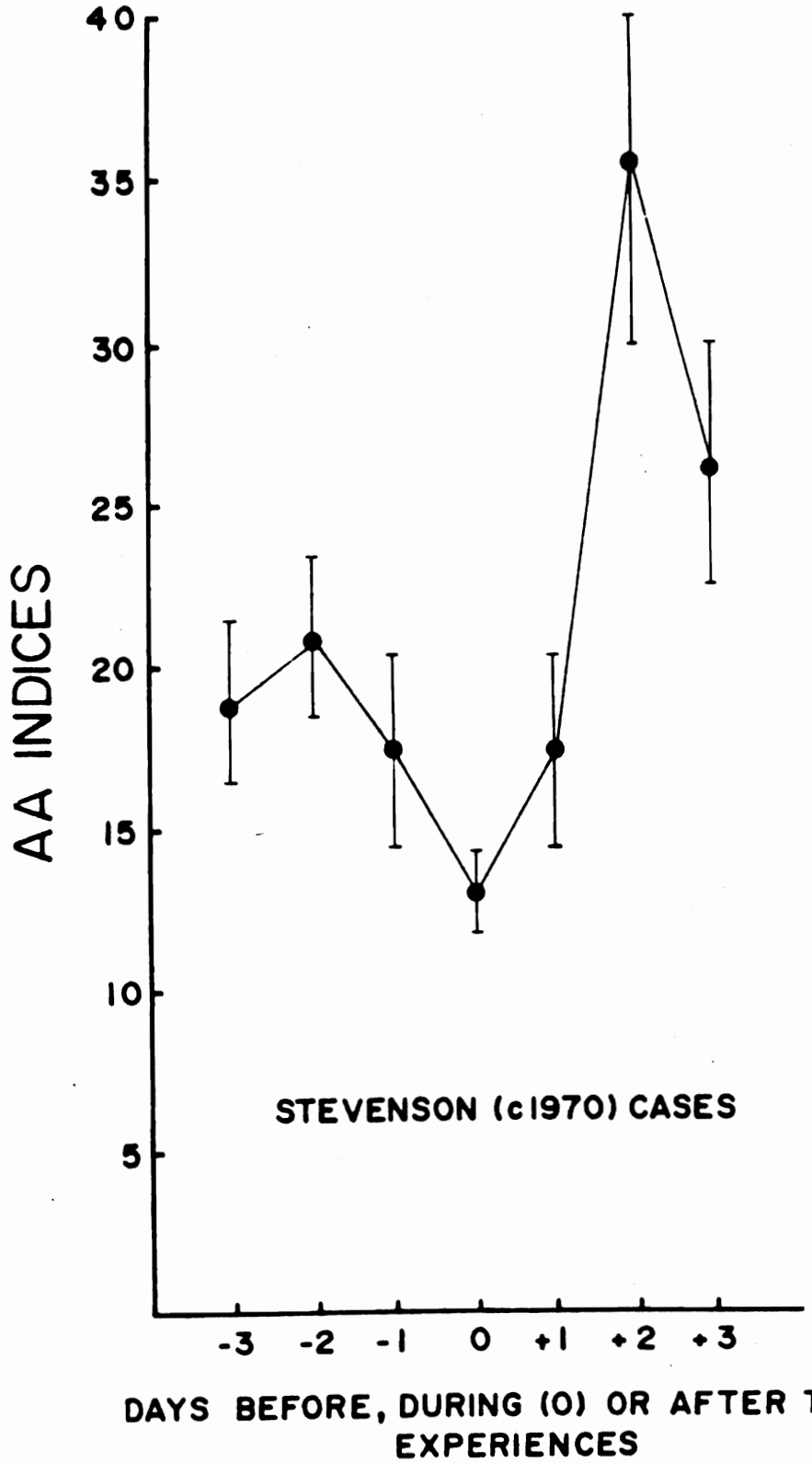

Fig. 3. Means and standard errors of the mean (vertical bars) for the aa indices on the days of (0) and days before and after the telepathic impression cases from the Stevenson 1970 sample. AA values for this figure were calculated by the same procedures noted in Figs. 1 and 2 (see text for explanation).

This optimal component is assumed to be present all of the time. Theoretically, T-C experiences could occur any time, given very special conditions of increased perception or detection by the brain. However, this optimal component is either not propagated to the same form or else there are multiple sources of competing stimuli. The conceptual development of these optimal stimuli and the neural mechanisms by which they are detected will be discussed in the next issue of Psi Research [5].

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NEW PSI RESEARCH GROUP IN BRAZIL

We have recently learned that a group of young, enthusiastic researchers in Brazil has established the National Institute for Psychobiophysical Research, affiliated with a local university. According to their letter to Psi Research, they intend "to study, analyze, and conduct experiments in the broad field of psychobiophysics." They are interested in exchanging information and cooperating with other research centers and groups. Since Brazil is an excellent place for field studies of psi, such cooperation may prove to be quite fruitful. The group can be contacted at the following address: Cristina T. da C. Rocha, General Manager, Instituto Nacional de Pesquisas Psicobiofisicas-INPP, Rua Tobias de Macedo Junior, 333 Bairro Santo Inacio, Cep 80 000 Curitiba - PR, Brazil.

Correction

Dr. Carroll Nash, author of the paper "A Test of Ingrated Multiple-Act ESP" published in the September/December 1984 issue of Psi Research, wrote us a correction to his paper as follows: "In Table 2, the **p** values for 'Code Seen' should be changed to $p<.001$ for Magargee and to $p<.01$ for 'Combined,' in agreement with page 22 of the body of the text." We apologize for this error.